

4B1
 1. (amended) A nucleic acid mimic in admixture with at least one target molecule selected from the group consisting of nucleic acids, transcription factors, carbohydrates and proteins, said mimic comprising a non-naturally occurring backbone structure to which are appended a plurality of heterocyclic bases,

at least one of said bases being substituted with at least one sterically bulky substituent at a position one, two or three atoms removed from the position of attachment of said base to the backbone.

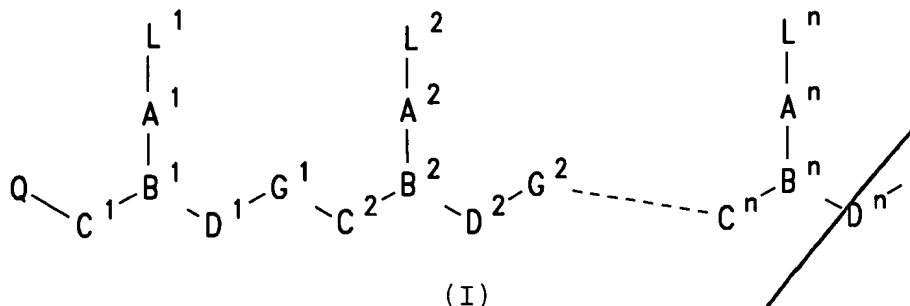
2. (amended) The nucleic acid mimic according to claim 1 wherein said sterically bulky substituent is $-R'$, $-OR'$, $-SR'$, $-N(R')_2$, $-C(R')_3$, $-C(=X)(R')$, $-C(=X)(-Y-R')$ or $S(=O)_{1-2}(-Y-R')$ wherein:

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 X is O, S or NH;

Y is O, S or NH; and

[wherein] R' comprises at least 3 atoms and is H , C_1-C_{50} -alkyl, C_2-C_{50} -alkenyl, C_2-C_{50} -alkynyl, C_7-C_{50} -alkyl-aryl, C_6-C_{50} -aryl, $C_{10}-C_{50}$ -naphthyl, $C_{12}-C_{50}$ -biphenyl, C_7-C_{50} -aryl-alkyl, pyridyl, imidazolyl, pyrimidinyl, pyridazinyl, quinolyl, acridinyl, pyrrolyl, furanyl, thienyl, isoxazolyl, oxazolyl, thiazolyl and biotinyl, wherein R' can be substituted one or more times by $-NO$, $-NO_2$, $-SO_3^-$, $-CN$, $-OH$, $-NH_2$, $-SH$, $-PO_3^{2-}$, $-COOH$, $-F$, $-Cl$, $-Br$ and $-I$.

-11. The nucleic acid mimic according to claim 1 having formula (I):



wherein:

n is at least 2,

each of L^1-L^n is independently selected from the group consisting of hydrogen, hydroxy, (C_1-C_6) alkanoyl, naturally occurring nucleobases, non-naturally occurring nucleobases, aromatic moieties, DNA intercalators, nucleobase-binding groups, heterocyclic moieties, and reporter ligands, at least one of L^1-L^n being said base substituted with at least one sterically bulky substituent;

each of C^1-C^n is $(CR^6R^7)_y$ where R^6 is hydrogen and R^7 is selected from the group consisting of the side chains of naturally occurring alpha amino acids, or R^6 and R^7 are independently selected from the group consisting of hydrogen, (C_2-C_6) alkyl, aryl, aralkyl, heteroaryl, hydroxy, (C_1-C_6) alkoxy, (C_1-C_6) alkylthio, NR^3R^4 and SR^5 , where R^3 and R^4 are as defined above, and R^5 is hydrogen, (C_1-C_6) alkyl, hydroxy-, alkoxy-, or alkylthio- substituted (C_1-C_6) alkyl, or R^6 and R^7 taken together complete an alicyclic or heterocyclic system.

each of D^1-D^n is $(CR^6R^7)_z$ where R^6 and R^7 are as defined above;

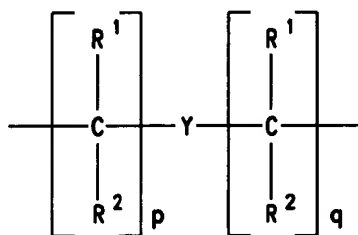
each of y and z is zero or an integer from 1 to 10, the sum $y + z$ being greater than 2 but not more than 10;

each of G^1-G^{n-1} is $-NR^3CO-$, $-NR^3CS-$, $-NR^3SO-$ or $-NR^3SO_2-$, in either orientation, where R^3 is as defined above;

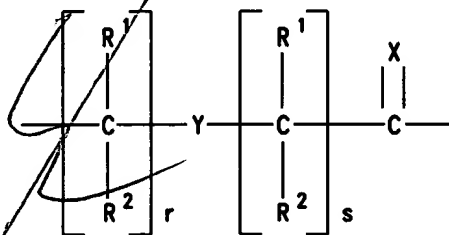
each pair of A^1-A^n and B^1-B^n are selected such that:

(a) A is a group of formula (IIa), (IIb) or (IIc) and B is N or R^3N^+ ; or

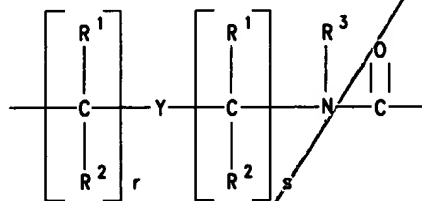
(b) A is a group of formula (IIId) and B is CH ;



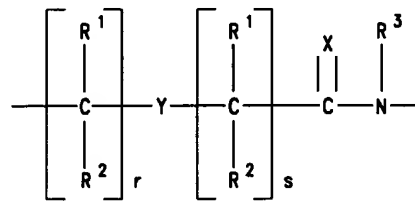
(IIa)



(IIb)



(IIc)



(IIId)

where:

X is O , S , Se , NR^3 , CH_2 or $C(CH_3)_2$;

Y is a single bond, O , S or NR^4 ;

each of p and q is zero or an integer from 1 to 5;

each of r and s is zero or an integer from 1 to 5;

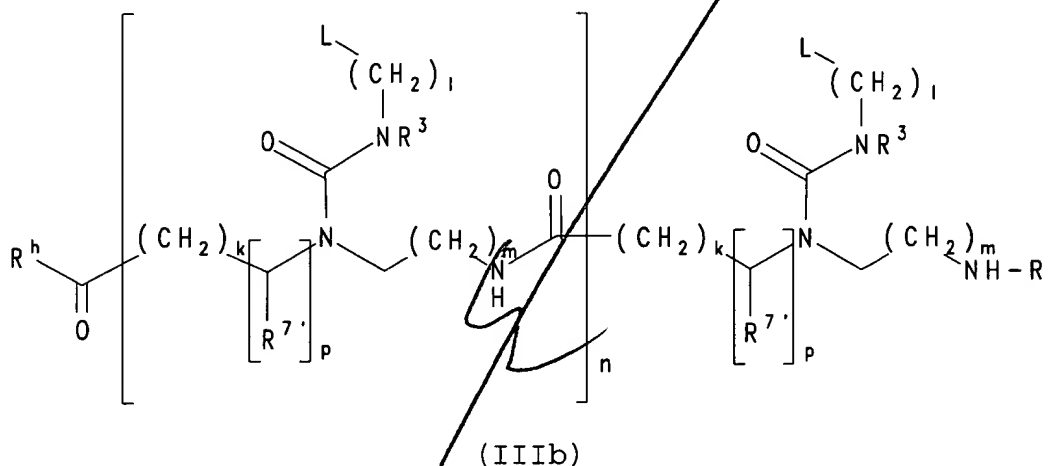
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p is zero or 1;

R^h is OH, NH₂ or -NHLysNH₂; and

Rⁱ is H or COCH₃.

21. The nucleic acid mimic according to claim 11 having formula (IIIb):



wherein:

each L is independently selected from the group consisting of hydrogen, phenyl, heterocyclic base moieties, including those substituted with a sterically bulky group or groups, naturally occurring nucleobases, and non-naturally occurring nucleobases, at least one L being said base substituted with at least one sterically bulky substituent;

each R^{7'} is independently selected from the group consisting of hydrogen and the side chains of naturally occurring alpha amino acids;

n is an integer from 1 to 60;